Spot Safety Project Evaluation

Project Log # 200505112

Spot Safety Project # 04-96-246

Spot Safety Project Evaluation of the Guardrail installation on NC 42 at all approaches on the Neuse River Bridge (Bridge #75) in Johnston Co.

Documents Prepared By:

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Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 04-96-246 - The Guardrail installation on NC 42 at all approaches on the Neuse River Bridge (Bridge #75) in Johnston Co.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis of the treatment data has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of guardrail at all approaches of the Neuse River Bridge (Bridge #75) on NC 42 in Johnston Co. NC 42 is a two-lane facility with no left turn lanes and has a 55-MPH speed limit. The Nuese River Bridge (Bridge #75) is narrower than the existing roadway. The initial crash analysis for this strip was completed from July 1, 1991 to June 30, 1996. There were a total of 8 crashes including 4 rear end, 3 left turn, and 1 overturning crash. The stated reason for this improvement was to reduce the potential of a vehicle's ability to travel into the Neuse River in the event of a crash. The final completion date for the guardrail installation along the subject road was on July 31, 1997 at a cost of $75,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from June 1997 to August 1997. The before period consisted of reported crashes from January 1, 1990 through May 31, 1997 (7 years, 5 Months) and the after period consisted of reported crashes from September 1, 1997 through January 31, 2005 (7 Years, 5 Months). The ending date for this analysis was determined by a limited time frame and available crash data in the before period. Since crash reports date back to January 1990, the after period was matched to the before period for an accurate analysis. The analysis consisted of the treatment data along NC 42 from MP 12.87 to MP 13.31 at the Neuse River Bridge with a 0' y-line. There was also an analysis completed at the intersection of SR 1705 at NC 42. This analysis was done to show the impact the intersection has on the treatment section. (See Table 2 and Location Map, Inset 1)

The following data table depicts the Naive Before and After Analysis for the above information. Please note that Ran Off Road Crashes were the target crashes for the applied countermeasure. These crash types considered are as follows: Ran Off Road-Left, Ran Off Road-Right, Ran Off Road-Straight, Overturn/Rollover, Fixed Object, Head-On; Sideswipe, Same Direction; Sideswipe, Opposite Direction.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	21	56	166.7
Total Severity Index	7.4	12.7	70.8
Total Rear End Crashes	7	24	242.9
Target Crashes	8	19	137.5
Target Severity Index	1.9	15.7	717.2
Volume	3800	7900	107.9
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Severe Crashes*	2	13	550.0
Severe **Wet** Crashes*	0	6	600.0
Low Severity Crashes*	19	42	121.1
Low Severity **Wet** Crashes*	6	13	116.7
Target Crash Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Severe Crashes*	1	8	700.0
Severe **Wet** Crashes*	0	5	500.0
Low Severity Crashes*	7	10	42.9
Low Severity **Wet** Crashes*	3	5	66.7

*Severe crashes are K, A, and B level injuries. Low severity crashes are C and PDO level injuries. An injury was unknown in one crash in the after period.

Table 1.

The naive before and after analysis at the treatment location resulted in a 166.7 percent increase in Total Crashes, a 137.5 percent increase in Target Crashes, and a 107.9 percent decrease in Average Daily Traffic (ADT).

	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Intersection Crashes **	8	23	187.5
Rear End Crashes **	3	12	300.0

**Crashes that occurred within 150' on either side of SR 1705 on NC 42.

Table 2.

Results and Discussion

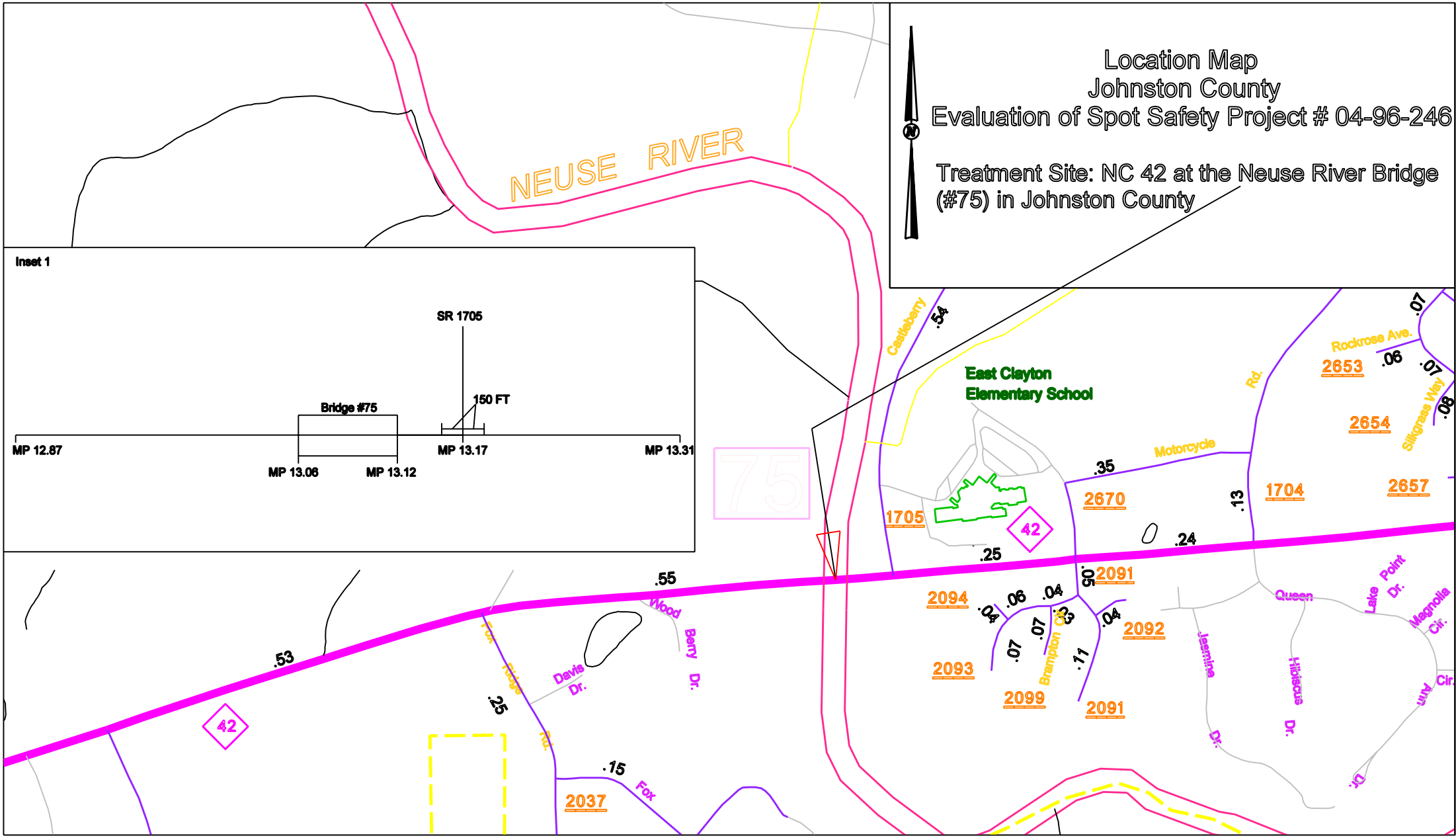
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 166.7 percent increase in Total Crashes and a 107.9 percent increase in Target Crashes. The summary results above demonstrate that the treatment location appears to have had an increase in the number of Total Crashes and an increase in the number of Target Crashes from the before to the after period.

Referencing Table 1, the target crashes (run off road type) for the before and after periods both attributed to less than 50% of the total crashes. As previously stated the guardrail was installed as a preventative countermeasure for vehicles traveling off NC 42 in the event of a crash. Although the target crashes did double from the before to the after period, the increase in volume doubled also. This may suggest that the original target crash trend remained the same and increased in proportion with the volume.

In Table 1, most categories increased by approximately 100%, with the exception of "Target Severity Index", "Severe Crashes", and "Severe Wet Crashes". The increases in these categories may be attributed to the significant rise in traffic volume and that most of the vehicles may still try to maintain the 55-MPH speed limit. High volume and high speeds on a narrow bridge with a school in the area may be too many variables to allow for absolute safe movement in this section.

A separate Table (2) was shown to quantify the effects the intersection has on the evaluation of the treatment section. Intersection crashes attribute for 43% of the Total Crashes in the after period. Within the intersection crashes 52% are rear end collisions. The rear end crashes may have a ripple effect further than 150 feet from the intersection due to the high traffic volume.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of road.



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Treatment Site photos taken December 6, 2005

Driving west toward SR 1705

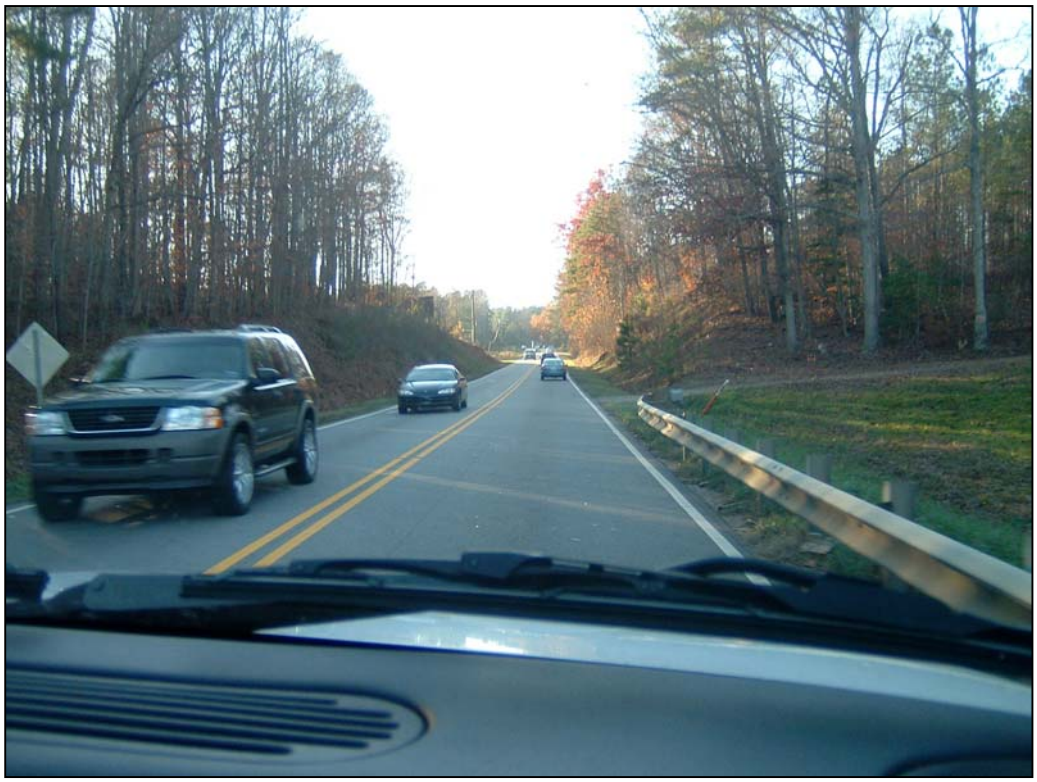
Pulled over at SR 1705

Driving west, just before bridge

Driving west on bridge

Driving west on bridge

Driving west, just after bridge



Driving west

Stopped on SR 1705 looking west

Driving east toward bridge

Driving east toward bridge

Driving east toward bridge

Driving east just before bridge

Driving east on bridge

Driving east on bridge

Just after bridge approaching SR 1705